DOCUMENT RESUME

ED 396 267 CS 012 512

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TITLE Reading with a Technology Twist.
PUB DATE Apr 96
NOTE 12p.; Paper presented at the Annual Convention and Exposition of the National Catholic Educational Association (93rd, Philadelphia, PA, April 9-12, 1996).
PUB TYPE Speeches/Conference Papers (150) -- Information Analyses (070)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Beginning Reading; *Computer Assisted Instruction; *Computer Literacy; Early Childhood Education; *Emergent Literacy; Language Acquisition; *Optical Data Disks; Reader Response; Reader Text Relationship; Reading Processes
IDENTIFIERS *Interactive Reading; *Technology Integration

ABSTRACT

This paper reviews the literature on the impact of technology on reading instruction, with a specific focus on language development as enhanced by the use of CD-Rom programs. The paper cites a study in which two separate groups, preschool children and third graders, were asked to talk about a story they listened to and saw on CD-Rom, providing them with an interactive reading event that included elements of listening, attending to illustrations, discussion of the story, and writing activities (for third graders only). Various programs on CD-Rom are suggested which can effect student learning by fostering enthusiasm for the computer, ease in revising writing, and generation of illustrations. The paper concludes by stating that the use of technology in the reading curriculum can also enhance children's learning experience with multiple intelligences, ranging from musical and linguistic to inter- and intra-personal intelligences. Contains eight references. (CR)

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READING WITH A TECHNOLOGY TWIST

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About ten years ago I read an article that spoke of future books being read from computer disks, and I shuddered at the thought of "cuddling up" with a computer book However, more and more, I find "electronic books" being advertised as *hot* items in the CD-Rom catalogues, and so I applied for a grant to study the impact of technology on Reading instruction. The rationale for the grant request was to determine the effectiveness of literacy events for emergent readers as prompted by the use of books on CD-Rom programs. The predictions of ten years ago seem to be happening now.

We appear to be in the middle of a technology revolution. Our students approach computers without any reservations and seem to be very at-home with technology. They can astound us with their dexterity and skill using computer games. When we look at the ancillary programs that accompany reading series we find that CD-Rom programs and laserdiscs are possible additions to the reading programs. In view of these developments, I think that we need to be aware of the possible programs that will enhance our teaching. Financially, we should also be aware that pricing competition will help these materials to be within the reaches of school budgets. A CD-Rom program, for example, costs about $40 or $50 and has a longer usage life than the traditional floppy disk programs.

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A recent monograph by David Reinking (1994) addresses the topic of Electronic Literacy. He reminds us that literacy is the condition of being able to read and write and that educators and educational policy makers need to

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expand the definition of literacy to include the reading and writing not only of printed texts but of electronic texts. According to Reinking, there are four fundamental differences between printed and electronic texts. They are:

- Electronic texts provide literal interaction between texts and readers.

- Electronic texts introduce an unprecedented capability of influencing what a reader attends to during reading.

- Electronic texts may have different structures

- Electronic texts employ new symbolic elements

The first difference delineated by Reinking looks at the interactive nature of the reading process. The April, 1996 issue of Reading Teacher includes an article by Klesius and Griffith titled *Interactive storybook reading for at-risk learners*.. The authors based their article on a child's interactions with printed text, but it is interesting to note that the benefits received by children from storybook reading experiences as listed in the article include aspects that are integral to CD-Rom storybook interactions. Some of these benefits are:

- Provides children with the meanings of words that may not be a part of their everyday speech (Holdaway, 1979; Strickland & Taylor, 1989; Taylor & Strickland, 1986)

- Engages children in language play that is centered on the sounds of language (Griffith & Olson, 1992; Taylor & Strickland, 1986)

- Fosters the ability to listen (Taylor & Strickland,. 1986)

• Helps children to become aware of literacy conventions (Cochran-Smith, 1986; Holdaway, 1979; Strickland & Taylor, 1989)

• Teaches children that language is symbolic, that the words and pictures in the book are not things but representations of things (Holdaway, 1979; Snow & Ninio, 1986)

To put this topic in perspective it is beneficial to examine some of the trends that national organizations have instituted. In 1990 the National Head Start Association reversed a 1984 decision saying that computers could not meet the developmental needs of children. However, in the past decade, technology has improved dramatically and children are able to use features such as full-color graphics, human-quality voice simulation, and interactive open-ended software packages. A three year study of Head Start programs was conducted to evaluate three broad objectives:

• identify the kinds of hardware and software that best supports young children's independent success with computers

• evaluate responses of children, teaching staff, directors, and parents to the opportunity to use computers

• determine the kinds of training and support that are needed to integrate a computer learning center into the curriculum

The highlights of the recommendations from this study are

• offer appropriate computer experiences to Head Start children so they, too, can be ready to meet the challenges of the Information Age

• offer the computer as "just another learning center" within the classroom where children may play independently and cooperatively/ Placing two students at a computer side by side facilitates "peer tutoring," where questions such as "How did you do that?" lead to sharing ideas and learning from one another.

• select software programs that support the needs of children to independently explore, discover, and learn. Experience with high-quality software enhances children's self-confidence, self-esteem, and problem solving abilities.

Today more than 25 percent of the nation's pre-schools, including 15 percent of Head Start programs offer computer activities to children. When used in appropriate ways (and this is important) computers not only support and enhance young children's creativity, self-esteem, and cooperative learning, but they are helped to develop a positive attitude about learning.

These suggestions concerning Early Childhood Education indicate the trends that are part of the curriculum picture. Therefore, it is important that teachers be aware of the ways to integrate computer technology into the curriculum and to be able to evaluate and use appropriate software. These teachers need to become aware that computers have the ability to provide a sense of equality among diverse groups of children. Research shows that the use of computers with children at risk contributes to an increase in thinking skills up to 25 percent.

The particular focus of this study was to investigate the impact of technology on Reading instruction with a specific focus on language development as enhanced by the use of CD-Rom programs. There have been negative connotations about a child's interactions with a computer. Some may

fear that the child works alone and becomes solitary, but the reality is that cooperative computer involvement necessitates the use of language so that children can talk about their experiences with each other. Additionally, we should remember that the reading act itself is a solitary exercise when the reader interacts with the text and then may move on to the next step of sharing information received through reading by engaging in conversation with the reader's peers.

In the field of reading the concept of "grand conversations" supports the beliefs that talking about one's experiences and perceptions enables the understanding / comprehension of these experiences. Reading is defined as a meaning-getting process. When a student's attempts at making meaning from text is encouraged, then the student is assisted in the process of learning to read. There does not seem to be any difference in reading from printed text or from text on a computer screen. Reading is reading! Peterson and Eeds (1990) believe in collaboration in the construction of meaning. Teachers working together with children and children interacting with each other may initiate responses, share interpretations, and construct meaning. Children practice making meaning as they make personal connections to the text and benefit from the insights of others.

In addition, reading and writing skills may be reinforced in a computer-enhanced language center. A variety of learning experiences integrates concepts that foster children's emerging literacy, starting with the most basic concept — that print represents the spoken word. The computer can also provides graphics and feedback that are not found in the print media.

This particular study was conducted with two separate groups — third graders and pre-school children. Each group listened to and watched a story on the CD-Rom. After this experience they were asked to talk about the story.

The program selected for the third grade students was *Big Anthony's Mixed Up Magic*. It was developed by Tomie dePaola and based on his *Strega Nona* story. After listening to the story, as told in the computer program, the students were asked to tell the story in their own words. This permitted a check of their understanding of the story. Then, they were asked to supply a different story line based on the original story. The CD-Rom program has additional activities that extend the story line, and these provide an excellent initiating event for a Language Experience Activity. The children were encouraged to spontaneously comment about the story and their interpretations of it. The story used for the pre-school children was one in the collection entitled *Wiggleworks*. The same procedure was followed allowing the children to listen to the CD-Rom program as it was presented in the story. After the listening experience, the pre-school children were asked questions about their understanding of the story. At first, they seemed to be quite timid about volunteering their opinions and directed all comments to the person who was directing the experience. The limited attention span of these children was also noted — at first, they were eager to comment but at the end of a twenty minute session, they began to "lose steam." These children became less inclined to participate towards the end of the session. However, in succeeding sessions,when the children became familiar with the format, they commented on the story as they interacted with each other as well as with the adult facilitator.

These two experiences provided children with an interactive reading event that included the elements of listening, attending to illustrations, and discussion of the story. Writing activities were included for the third grade children and would certainly be appropriate for the pre-school children as a Language Experience Activity.

In the November, 1995 issue of *Educational Leadership* Guthrie and Richardson discuss Computer Literacy in the primary grades. They have researched a program developed by Apple Computers entitled *Early Language Connections (ELC)*. The program is designed for kindergarten through grade 2 and integrates Macintosh computers, children's literature, instructional software, and other curriculum materials including sample lessons constructed around thematic units. Guthrie and Richardson are from the Center for Research, Evaluation, and Training in Education (CREATE) and they are involved in a three -year longitudinal study of the role of educational technology in educational reform in kindergarten through 2nd grade classrooms across the country. The article discusses how ELC is used in the classrooms and how it is changing the way that teachers teach, but an important piece of the research discusses how ELC affects student learning. Some of the factors that indicated the success of the program included:

• students were eager to have time at the computer — teachers reported that the students wrote more and produced longer and better compositions

• the ease of revising and editing at the computer provided an incentive for writing

• computer programs enabled students to generate their own illustrations through the computer program

The program is used in a school in Camden, New Jersey and the teacher, Pat Robinson, reported that a girl came to her class in December unable to read. During language arts, the child was teamed with students who were proficient with technology and the teacher reported:

> She's reading now. She's reading because she knows that in our classroom, you have to write your own story. She was master of ceremonies our play of *Little Red Riding Hood*. She typed her own introduction for the play, and was very excited about that.

The article concludes with the comment that this breakthrough was possible because the teacher was able to establish a learning environment based upon collaboration, peer support, appropriate technical tools, and motivation (Guthrie & Richardson, p.17).

The preceding comments reflect an examination of the integration of reading and technology in the primary grades. The same principles also apply to the intermediate grades. The authoring programs such as *Storybook Weaver*, and *Children's Writing and Publishing Center* provide opportunities for children to write original stories and then share them with their peers. These programs have built in graphics so that the children can illustrate their stories.

In the Broderbund materials, the school package provides classroom activities which have curriculum connections. These activities are are grouped in six curricululm areas: Language Arts, Reading, Writing, Science, Math, and Music. Each curricululm area has activities appropriate for several age levels, from preschool through intermediate grades. The materials also include the titles of additional book titles that would support the key title. For example,an

annotated bibliography featuring mystery books accompanies the CD-Rom program *Harry and the Haunted House*.

When we consider the use of technology in our Reading curriculum we should also be aware of the concepts presented in the area of multiple intelligences. The theory of multiple intelligence identifies a number of separate human capacities, ranging from musical and linguistic intelligences to interpersonal and interpersonal intelligences (Gardner, 1993). This theory suggests that if we look directly at the functioning of all intelligences, we will have a view of learning that is not limited to our traditional view of learning that focuses on linguistic and logical - mathematical understanding. Such a view could lead to more intelligence-fair assessment in our schools and further realization of the cultural influences that are present in children's learning styles. Experience has provided insights that children's interactions with the computer can be sharpened by the application of this multiple intelligence perspective. It has been suggested that advances in computer technology are designed to provide a range of multi-media experiences combinging graphics, sound, and varied activities. One of the exciting potentials of the computer, and possibly one of the reasons for its widespread appeal, is the ability to provide various kinds of experiences that are often overlooked but that could offer children with diverse intelligences an opportunity to learn and express themselves in different ways.

So, how far fetched is the concept of "cuddling up with a CD-Rom?" Perhaps such a possibility does not seem as farfetched today as I might have thought only a few years ago. Bolter (1991, as cited in Reinking, 1994)) suggests that we are living in the late age of print. He tells us that the intellectual

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advantages of hypertext are so compelling that they are destined to replace the book as the dominant form of communication. However, Reinking believes that

> books and other printed materials are not likely to disappear within our lifetimes even if the technologies supporting such a change were to become widely available. In literate cultures, books tend to evoke powerful aesthetic and emotional responses independent from their content. It is not likely that his deep-seated attachment to printed books will disappear regardless of the intellectual advantages of electronic texts (p.15).

As educators, we need to be aware of what is available for our students and of the appropriate means of integrating those materials with the curriculum.

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